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ABSTRACT

Human capital is one of the central strategic factors in the location of production facilities in Germany. It can be formed and maintained only by qualified basic education, vocational training, and further training. The best possible and continuously updated qualifications are necessary and advantageous for the individual as well. Unskilled persons are subject to the greatest job risks and often find inadequate job opportunities. The number of jobs for unskilled persons will continue to decrease. Business and the public sector will require even higher qualifications at all levels in the next few decades, if Germany is to hold up to international competition. The appeal of the dual system of vocational training and of subsequent further training must be enhanced to meet the future demand for skilled labor. The best way to achieve a balance between practical vocational training and theoretical training in schools is to provide adequate recognition for both in subsequent employment. Conditions for studying at universities must also be improved. The priorities for education reform are as follows: shorten the time spent at the university, reduce the dropout rate, improve the quality of teaching, and make university studies more efficient. Universities must adjust the subject matters covered to meet the changing demands of society and industry. Universities' chronic lack of funds must be overcome and enrollments increased. (Three data tables are appended.) (YLB)

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IAB labour market research topics

No. 8

Institut für Arbeitsmarkt- und Berufsforschung

Institute for Employment Research

F. Buttler/M. Tessaring

Human Capital as a Location Factor

Arguments for the Education Policy Discussion From a Labour Market Policy Standpoint

- The Earning Structure
- The Need for Reform

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- occupation sociology
- research in skills and qualifications
- technological development and the labour market
- business and personnel management

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Friedrich Buttler/Manfred Tessaring*)

HUMAN CAPITAL AS A LOCATION FACTOR

Arguments for the education policy discussion from a labour market policy standpoint

0 Abstract

1 The Significance of Human Capital

2 Education, Training and Employment

3 Need for Reform

4 Appendix

*) Researchers of the Institut für Arbeitsmarkt- und Berufsforschung

0 Abstract

Human capital is one of the central strategic components for the location of production facilities in Germany. Human capital, however, can only be formed and maintained by qualified basic education, vocational training and further training.

The best possible and continuous qualifications are necessary and advantageous for the individual as well. Unskilled persons are subject to the greatest job risks and often find inadequate job opportunities. The number of jobs for this group of persons will continue to decrease. Business and the public sector will need even higher qualifications at all levels in the next few decades, if the Federal Republic of Germany is to hold up to international competition.

Therefore, the appeal of the dual system of vocational training and of succeeding further training must be enhanced and the conditions for studying at university improved.

However, although active qualification and further training policies are necessary, they are by no means sufficient for managing structural change. Other policy areas and the job system itself will still be called upon to make their contributions to the process.

1 The Significance of Human Capital

Human capital is becoming Germany's most significant production factor. Today the economic "value" of the human resources of West Germany's entire active population, expressed by spending for education and training, amounts to about half of the value of all tangible assets in the form of buildings, equipment, communications and the like. In 1989 the value ratio of material capital stock (DM 8,963 bn) to human capital stock (DM 4,494 bn) was about 2.2:1[1] (Table 1); in 1970 the ratio had been 3.2:1 and in the years between the World Wars 5:1 and 4:1 resp.[2] As material resources and raw materials are short and

[1] Material capital stock (gross tangible assets in the annual average) and estimated human capital stock (assessment of active and unemployed population in 1989, categorised according to qualification and age and the educational expenses for them for regular educational careers, excluding income lost due to education) in prices of 1985. Because this does not reflect multiple qualifications as well as private and public spending on further education, the human capital stock probably represents the lowest possible value. Sources: Federal Statistics Office, Specialised serial publications, several editions, also: Bildung im Zahlenspiegel <Education Reflected in Figures>, several editions; Federal Ministry for Education and Science: Grund- und Strukturdaten <Basic and Structural Data>, several editions; for data on participants intraining and expenses prior to 1960 see Albert, W., Oehler, Ch.: Materialien zur Entwicklung der Hochschulen 1950 bis 1967 <Material on the Development of Universities from 1950 to 1957>, HIS Hochschulforschung, Vol 1, Hanover 1969. Kohler, H: Der relative Schul- und Hochschulbesuch in der Bundesrepublik Deutschland 1952 bis 1957 ; Ein Indikator für die Entwicklung des Bildungswesens <Relative attendance of schools and universities in the FRG from 1952 to 1957; an Indication for the Develpment of the Educational System>, Materialien aus der Bildungsforschung no. 13 (editor: Max-Planck-Institut fürBildungsforschung, Berlin 1976)

[2] These calculations cannot be compared without reservations, though. For the 1970 calculation (in 1970 prices) see: Weisshuhn, G.: Sozioökonomische Analyse von Bildungs- und Ausbildungsaktivitäten <Socioeconomic Analysis of Activities in Education and Training>, Berlin 1975, p. 45. This calculation also

international competition is getting fiercer, human capital will become even more decisive for Germany's viability as a location for production sites. This has major consequences for the development of the educational system, although this is by no means the only reason. The value of education and training is not only determined by the economy or the labour market. Education and training are just as important for the democratic and cultural development of a society and hence for the individual's ability to partake in it.

The qualification of the labour force has vastly increased in the course of the last three decades. The percentage of unskilled people dropped by half from over 40% to almost 20%. At the end of the fifties about half of the active population had a vocational qualification, while they constitute two thirds today. The percentage of the labour force holding an academic degree increased from 4% to over 12% (Table 2)[3].

Projections cannot forecast the future, merely define a range of scenarios under certain assumptions. They are subject to many uncertainties and must therefore always be considered to be model calculations, which alert to undesirable developments, indicate the route to certain objectives or the effects of policies. They may never substitute policy decisions, at best they may justify them and only to a very limited extent can they serve as the basis for an individual's choice of training or career.

The existing projections for the future demand for qualifications[4] in Germany are almost unanimous in that the demand for qualified and highly qualified manpower will continue to grow in the next two decades, provided the long-term structural trends of the employment system, the requirements of innovative technologies, different production and organizational concepts in companies and the population's demand for education persist. Although one must admit that there are a great number of uncertainties in forecasting future developments, including the manpower supply. It is interesting to note that these projections forecast the same trends that Leontief et al forecasted in the mid-eighties for the USA with the help of a detailed input-output model[5] . They stated that the demand for unskilled or semi-skilled workers, clerical workers, production hands and skilled workers in production would drop further, while the demand for highly qualified labour (particularly university graduates) would experience a steep increase.

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includes income lost due to education. For the calculations for the years prior to 1945 see: Krug W.: Quantitative Beziehungen zwischen materiellem und immateriellem Kapital <Quantitative Relations Between Material and Immaterial Capital Resources>, in Jahrbücher für Nationalökonomie und Statistik, Vol. 180, 1967, p. 59 ff.

[3] The table also illustrates that the measurement of the long-term development of the qualification structure is only possible to a limited extend due to the different demarcations in the macrocensus

[4] See demand projections of IAB/Prognos (Prognos AG et al: Arbeitslandschaft bis 2010 nach Umfang und Tätigkeitsprofilen <Labour Scenario Until 2010 by Volumes and Job Profiles>, Beiträge zurArbeitsmarkt- und Berufsforschung (BeitrAB) 131.1 and 131.2, Nürnberg 1989, and based on it, Tessaring M. : Tendenzen des Qualifikationsbedarfs in der Bundesrepublik Deutschland bis zum Jahre 2010; <Manpower Requirement By Levels Of Qualification In West Germany Until 2010>, no. 4 in this series; Weisshuhn , G. Wahse, J.: Wirtschaftswachstum, Qualifikationen und berufliche Tätigkeiten im vereinten Deutschland bis zum Jahre 2010 <Economic Growth, Qualifications and Occupations in Unified Germany Until 2010>; Expertise commissioned by the Federal Minister for Educationand Sciences, 1993 (unpublished)

[5] See Leontief, W.W.: The Impact of Automation on Employment 1963-2000, New York 1984. Leontief W.W., Duchin F. (editors): The Future Impact of Automation on Workers, Oxford 1986

Everywhere in industry jobs for unskilled labour are being cut back: until 2010 their share will have dropped to 13%. For about 70% of jobs labour with middle-level qualifications and for 15-18% university graduates will be required [6]. Irrespective of the differences in methods and data used, these projections show that very similar basic structures and changes thereof are foreseen. Secondly, the differences point out that politics and planning must think within certain broadly defined margins and take decisions although uncertainties persist, because forecasts are intrinsically difficult. The results of the BIBB/IAB survey 1991/92[7] and the 1991 micro census largely confirm the changes in manpower structures for industries, activities and qualifications until that date as forecasted by IAB and Prognos at the time.

The demand for higher qualifications has complex causes. Employment in the manufacturing of goods is receding, while that in services is increasing. In the eighties service industries were the major growth industries. At the same time jobs became more focused on services – even in production almost 40% of all jobs show the characteristics of services. Sophisticated production activities like setting, control and maintenance of machines and production plants are gaining importance in production, many service activities not requiring skills became obsolete, because they were integrated into other jobs. In both fields routine tasks are being assimilated by new technologies, therefore process-oriented, interdisciplinary job contents making higher demands on competence and qualification at all levels are continuously advancing.

By decentralizing employees' responsibilities, new concepts of production and organization can streamline hierarchies. This in turn means that higher qualifications are also demanded in middle-management. Both at this level and at the executive level innovation and creativity – supported by permanent further training – are called for. Some middle-management positions are given to university graduates who are encroaching upon these positions into which apprenticeship-trained employees used to be promoted. Some continue to be filled by the latter and provide career prospects for them when activities overlap. This is particularly true when skilled labour – as intended by the new training regulations – is capable of planning, executing and controlling its work independently. University graduates have never automatically entered the executive level, nor are they doing so now; traditionally they filled the higher positions at the medium level as

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[6] There are several reasons for the differences in the demand forecasts (Tessaring 1991 or Weisshuhn/Wahse 1993, op.cit). For one, the studies used different statistics (IAB/Prognos or Tessaring: National Accounts and Microcensuses. Weisshuhn/Wahse: employent statistics, supplemented by microcensuses). Already the initial values differ considerably which has repercussions on the projections. Secondly, the two projections use different demarcations (IAB/Prognos or Tessaring: job profiles, i.e. tasks at work, Weisshuhn/Wahse: occupations) and projection methods (Tessaring: exponential trends of proportions of qualifications in the activities approachng limiting values. Weisshuhn/Wahse: Linear trends of qualification structures of industries and occupations). The stability of the forecasted structures is surprising despite these differences. Considering the different levels, the changes in demand are very similar for the different levels of qualifications or they are within the margins normal for such long-term projections.

[7] See Parmentier, K. et.al.: Berufs- und Erwerbsstrukturen West- und Ostdeutschlands im Vergleich <Comparison of Occupational and Employment Structures in East and West Germany>, BeitrAB 176, Nürnberg 1993.

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teachers, in administration, self-employment or legal professions, in staff functions as researchers, engineers etc. As the numbers of graduates are growing and jobs are exerting stronger demands this distribution will change: it is not possible that several million university graduates make up the "upper ten-thousand", but they might make up the "upper five or six million".

Countries in Southeast Asia are becoming more competitive and production locations in our direct neighbourhood in Eastern and Central Europe are becoming more attractive, therefore German industry must above all strengthen its competitive position with intelligent, high-grade and innovative products, services and production processes. The new challenge is that technologically other competitors have come on a par with or even overtaken Germany, imitating competition is catching up faster and the cost of labour is much lower in the competing countries. If the FRG wants to prevent or at least curb competition via the cost of labour, productivity must grow significantly and the stagnation of productivity resulting from unification and the booming economy until 1991/92 must be overcome[8].

Productivity increases call for accelerated structural change for which qualification and re-qualification are of special importance. Higher qualifications at all levels require higher priority for education, science, research and technology. This necessity is clearly confirmed by the dropping number of applications for patents with relevance for the world market which is lagging behind those of Japan and the USA (Fig. 1) and by the drop in exports of R&D-intensive goods[9]. "Here ... in contrast to its two main competitors (USA and Japan - author's note) ... Germany suffered a severe decline in international market shares in trade with R&D-intensive goods. This gives cause for concern because it seems to be a continuation of a long-term trend characteristic for the German economy's standing in the market, after it had been the main exporter of R&D-intensive goods at the end of the eighties, ahead of Japan and the USA." [10]

One can hardly imagine that it will remain without consequences for the economic location, if the high potential of talent is not utilized or - worse still - existing training efforts are even scaled down. In addition, the proportion of older workers is increasing in many occupational groups and therefore the replacement demand is growing. The course must be set today to ensure that there will be sufficient young talent, either as skilled workers or as highly qualified young people. By creating additional part-time jobs, industry and administration could absorb at least some of the abundant graduates now and establish ties to skilled people.

In the long run the drop in the birth rate in the nineties (in west and east Germany) will affect the entire educational system and thus the number of young workers available after the end of the next decade. These effects will be much more drastic than those of the drop

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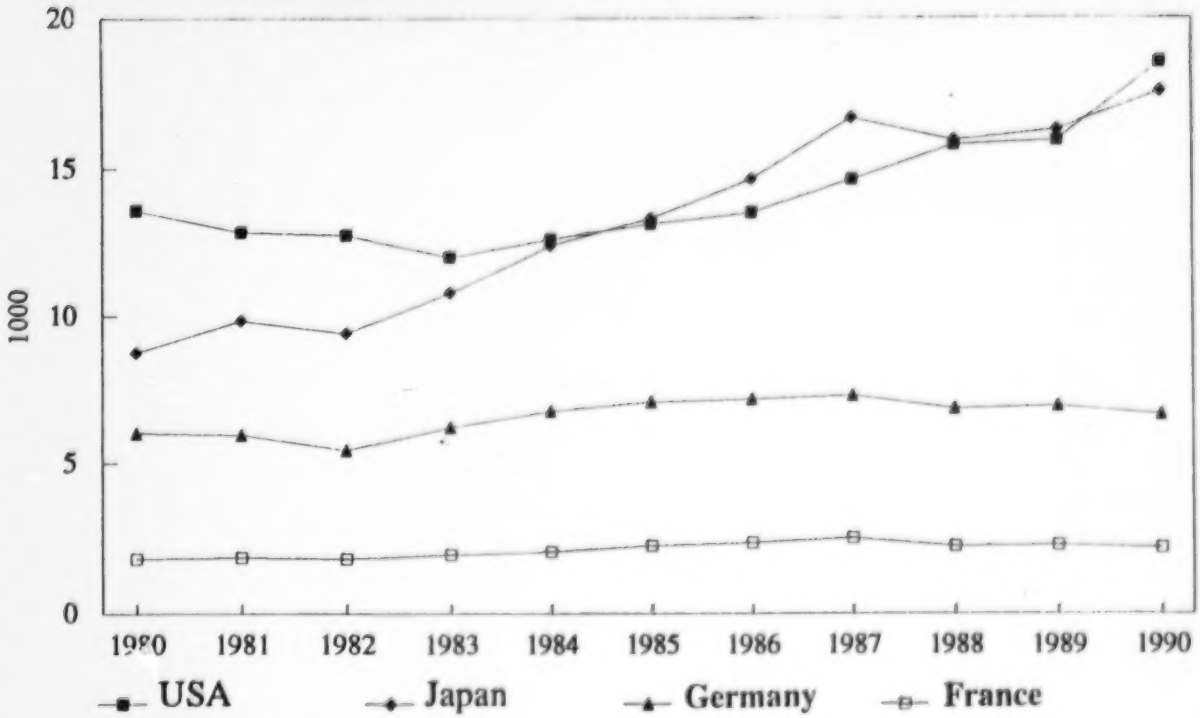
[8] See Prognos AG: Deutschland Report No. 1, Basel 1993

[9] See Federal Ministry for Research and Technology (BMFT), editor, Bundesbericht Forschung <Federal Report on Research> 1993, p. 47 ff and Documentation of the BMFT for the Discussions in Principle on Educational and Research Policy on November 11, 1993 (photocopy)

[10] BMFT, Federal Report on Research 1993, op.cit., p. 49

Fig. 1: Patents with Relevance for the World Market According to Countries of Origin *



* Inventions with patent applications in the triade and patents already granted in the USA (at least)

Source: BMFT 1993

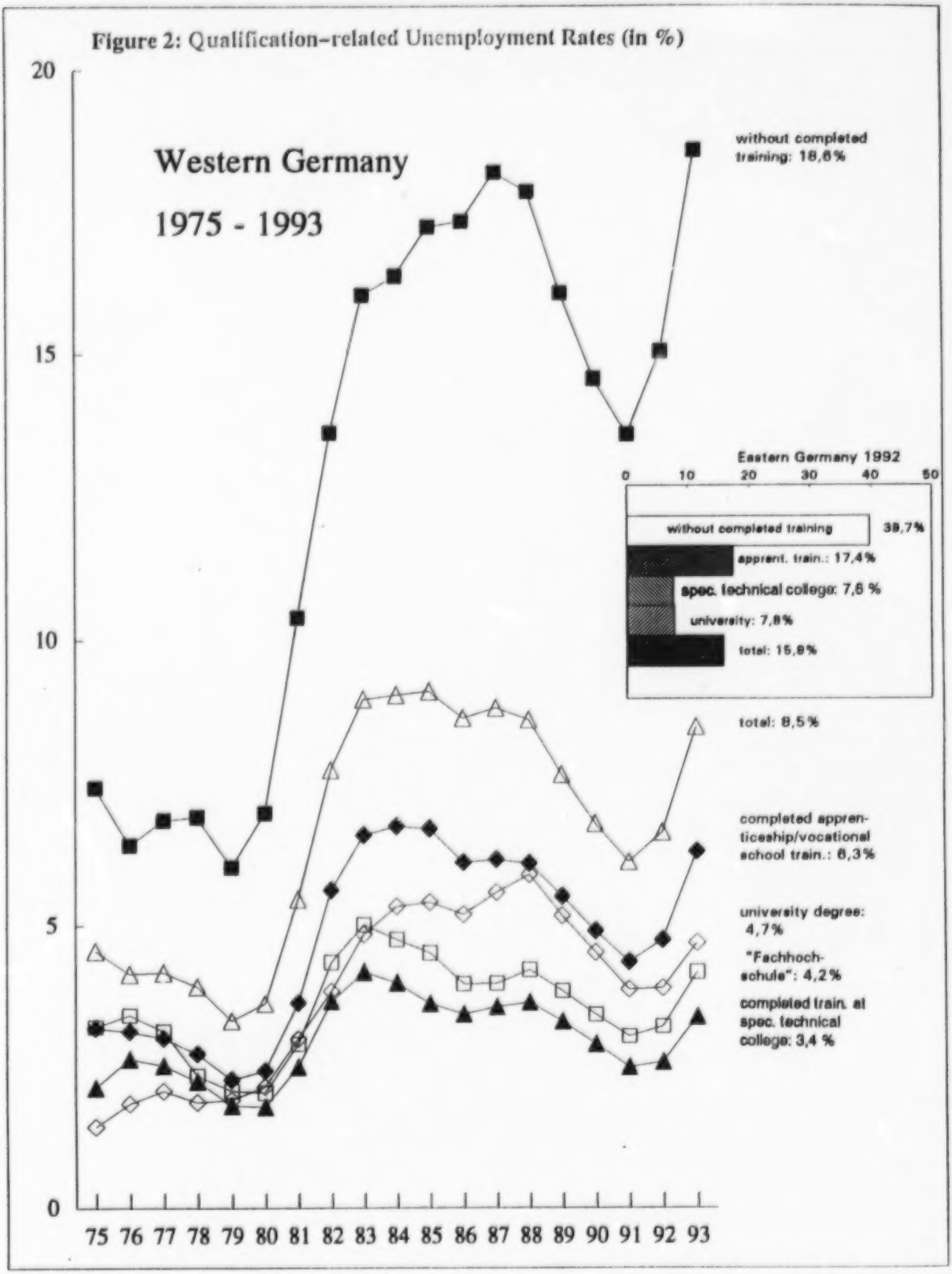
in the birth rate in the sixties. In this context it would be extremely detrimental if companies ceased in their efforts to provide training due to the poor economic situation or if an alleged "flood of graduates " might lead to neglecting technology and natural sciences. Although the labour market and industry are a major element, they are not the only ones that count. To preserve the "cultural location Germany", neither the arts, nor humanities, nor social sciences maybe forgotten, despite all economic constraints.

2 Education, Training and Employment

The high esteem in which training and education are held by the employment system and the labour market impressively reflects its weight – this fact has hardly changed over time. Although they are strongly dropping in numbers and proportions, unskilled workers clearly bear the greatest risk of becoming unemployed and their human capital is utilized to the smallest extent (85%) (Table 1). On the other hand, unemployment of skilled workers, irrespective of level of qualification, is below average, their utilization is about 95%. The new Federal States where unemployment figures are higher, the ranking in

unemployment in the course of the transformation process worked just as clearly in favour of qualified, particularly highly qualified workers (Fig. 2 and Table 3).

Figure 2: Qualification-related Unemployment Rates (in %)



* Unemployed as % of dependently employed persons (excluding apprentices and soldiers) with the same qualifications; 1990–1993 preliminary estimates, for further notes and source see table 3 (appendix)

The economic recession is boosting the unemployment of skilled workers and university graduates even in those disciplines that had been favoured so far (chemistry, engineering, physics). In addition, one must be aware that unemployed recent university graduates are not adequately represented in unemployment statistics, because most of them cannot claim any benefits and are therefore taking recourse to other methods of looking for jobs. However, it is nothing new that the search for a job after graduation takes a considerable period of time, therefore the current situation should not mislead to underestimate the medium- and long-term demand for such qualifications[11]

There are other indications, as well, proving the close interdependence of level of education and standing in employment, i.e. the "educational meritocracy" of our society. The distribution of earnings according to levels of qualification and the returns for further education show that education still pays. [12] Over time it is also obvious that the proportion of the income earned by university graduates is growing more than their proportion of the labour force: the opposite trend applies to skilled workers (Fig. 3). E.g. the proportion of workers with completed apprenticeship or Berufsfachschule <full-time vocational school> training of the active population grew more than their share of the total income; the gradient of the regression line (b = 0.5) is increasingly deviating from the 45° line (equal distribution); the situation is different for university or higher professional training college graduates, their share of total income is growing stronger than their share in the active population (gradient 1.0 for university graduates and 1.5 for graduates from higher professional training colleges).

Closely related hereto is the fact that university graduates are holding the most senior positions in company hierarchies, so far the career prospects for workers trained in the dual system are much less bright. In addition, almost 30% of all dual-system trained workers are filling jobs for semi-skilled or unskilled workers, although their earnings are higher than they would have been in the company they were trained in[13]. A maximum of 14% of university graduates are working in jobs that are clearly below their levels of qualification[14].

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[11] One should beware of making the same mistake as in the early eighties when an acute shortage of engineers was complained about, consequently the numbers of students in these courses exploded. A few years later there was absolutely no shortage of engineers anymore, rather these graduates found a saturated labour market. In view of the long periods of training and the respective time lags it is particularly essential that educational policy becomes consistent.

[12] See Belimann, L., Reinberg, A., Tessaring, M.: Bildungsexpansion, Qualifikationsstruktur und Einkommensverteilung Eine Analyse mit den Daten des Mikrozensus und der Beschäftigungsstatistik <Educational Expansion, Qualification Structure and Distribution of Earnings. An Analysis based on Data of the Microcensus and Employment Statistics>, in: Lüdeke, R. (editor), Bildung, Bildungsfinanzierung und Einkommensverteilung <Education, Financing Education and Distribution of Income> Volume II: Schriften des Vereins für Socialpolitik, Berlin 1994 (forthcoming)

[13] See Tessaring, M.: Das duale System der Berufsausbildung in Deutschland: Attraktivität und Beschäftigungsperspektiven <Germany's Dual System of Vocational Training: Appeal and Employment Prospects>, in: MittAB 2, 1993, p. 147 ff.

[14] This resulted from an evaulation of the 1991 microcensus on education, career position and occupation exercised by higher education graduates (see Plicht, H., Schober, K., Schreyer, F.: Ausbildungsadäquate Beschäftigung und Berufszufriedenheit bei Hochschulabsolventen und -absolventinnen im Zeitverlauf <Longitudianal Study of Employment Conforming to Education and Job Satisfaction of University

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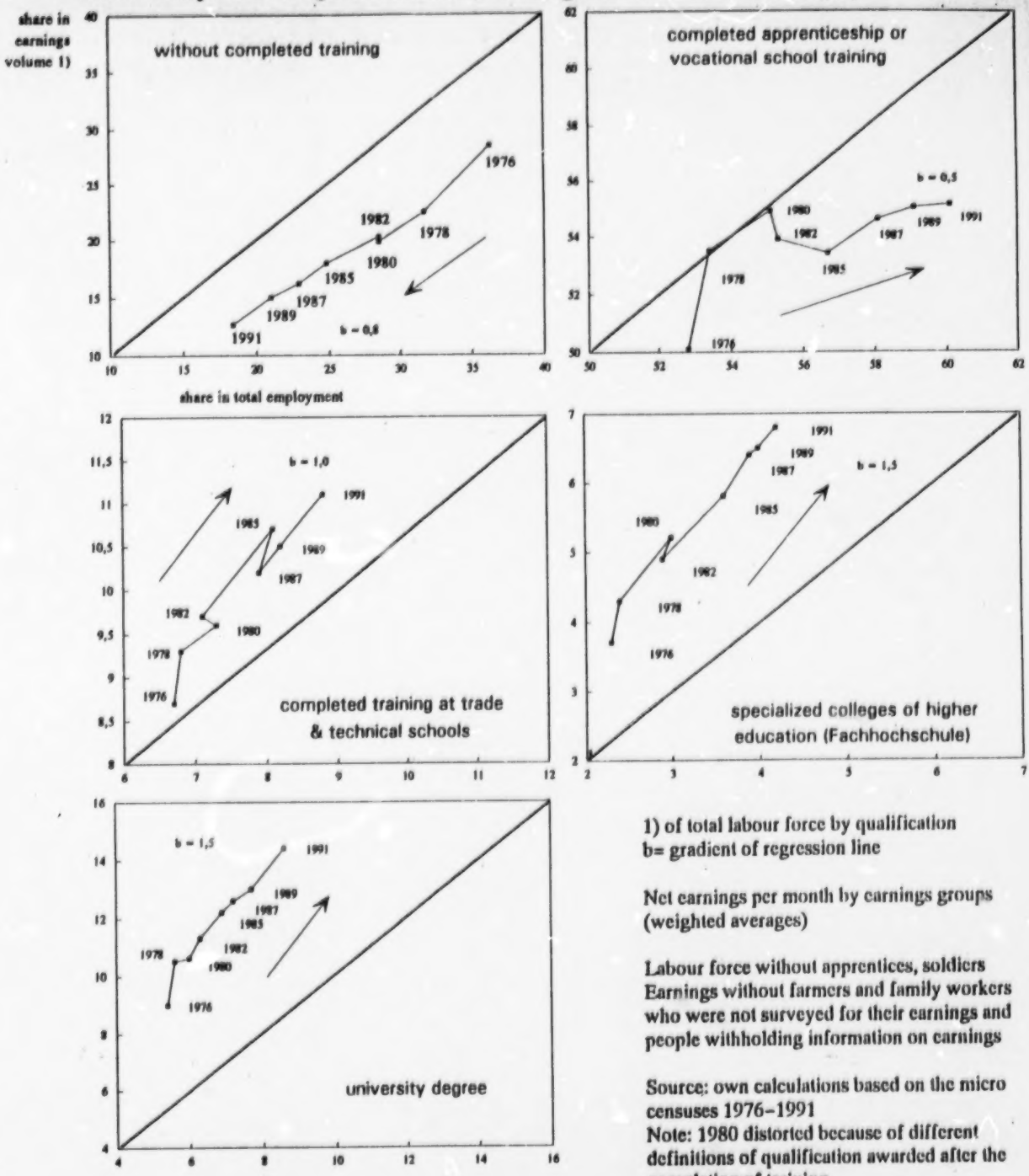
Figure 3 :
Relationship Between Qualification and Earnings Structure 1976 – 1991 (%)


share in earnings volume 1)
without completed training
completed apprenticeship or vocational school training
share in total employment
completed training at trade & technical schools
specialized colleges of higher education (Fachhochschule)
university degree

1) of total labour force by qualification
b= gradient of regression line

Net earnings per month by earnings groups (weighted averages)

Labour force without apprentices, soldiers
Earnings without farmers and family workers who were not surveyed for their earnings and people withholding information on earnings

Source: own calculations based on the micro censuses 1976–1991
Note: 1980 distorted because of different definitions of qualification awarded after the completion of training

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Graduates.> Unpublished manuscript, Nürnberg993). The percentage of 25% of university graduates in non-conforming occupations quoted in public discussion therefore is not substantiated by statistics and empirical findings. It is true, however, that the proportions vary depending on sex and age: women and younger people are more frequently employed below their educational level.

Groups also differ in the extent to which they are participating in further education which is an important condition to maintain and enhance qualifications, secure the job and advance: it is still university graduates who participate in further training at an above average rate; the participation of medium-level skilled workers is on the rise, but still below average, especially for the age group above 45 years[15]. Further training means to human capital what maintenance, renewal, up-keep etc. means to material assets; unless maintained – the capital's value erodes.

Not yet existing equal opportunities in general and practical education decisively affect the choice of education by young people and their parents. In an open educational society the ties of certain population classes to the former standard careers – i.e. from elementary school via apprenticeship to skilled worker or from upper secondary school via higher education to university graduate – have become looser; the permeability of educational and training careers has increased. Although the dual-system training is generally held in high esteem, frequently a higher educational degree is desired. Many more parents want their children to achieve the university entrance qualification (Abitur) or a secondary school graduation than is expressed in the present distribution of educational qualifications. There are no differences in the aspirations in east and west Germany in this respect.

Thus preference is often given to achieving university entrance qualification, simply because this offers more options, although not everybody prefers the conditions and subject matters offered by university studies. Therefore choosing the route to university entrance qualification or university studies cannot necessarily be considered as choice of occupation, but rather as a choice for more options.[16] The preferred option depends more on the expected employment conditions and career prospects than on the subjects and conditions of training. When there is a great deal of uncertainty about the future opportunities in employment and career advancement, such as young people in east Germany are experiencing, choosing an option may be in favour of the subject of training or in deciding against university studies. This does not apply, however, to the great appeal of the "Gymnasium" school leaving certificate which grants university entrance qualification. This also goes to show the difficulty of maintaining the importance of Hauptschule in a three-tier school system.

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[15] See Parmentier, K. et al.: Berufs- und Erwerbsstrukturen West- und Ostdeutschlands im Vergleich. Ergebnisse aus der BIBB/IAB-Erhebung 1991/92 <A Comparison of West and East German Occupational and Employment Structures. Results of the BIBB/IAB survey 1991/92>, BeitrAB 176, Nürnberg, 1993, p. 49 ff.
For 1990-1992 the participation rates for further training including retraining in west Germany, classified according to the highest educational level reached were the following: with dual-system training 19.3%; graduates from Fachschule 31.6%; university graduates 40.7%. Note that retraining is almost insignificant for university graduates. In 1992 only 5600 university graduates took up retraining (source: Bundesanstalt für Arbeit. Statistics on participation in vocational further training, retraining and familiarization in 1992).

[16] See as a survey: Schober, K., Tessaring M.: Die unendliche Geschichte. Vom Wandel im Bildungs- und Berufswahlverhalten Jugendlicher. <The Never-Ending Story: On the Behavioural Change of Educational and Occupational Choice of Young People.> Materialien aus der Arbeitsmarkt- und Berufsforschung (MatAB), 3/1993, p. 13

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3 The Need for Reform

The appeal of training in the dual system must be enhanced by measures in the employment system to meet the future demand for skilled labour[17]. The best way to achieve equality of practical vocational training and theoretical training in schools is to provide adequate recognition for it in subsequent employment. Skilled-workers trained in the dual system would have brighter perspectives in the overlapping field of senior positions which are at the same time new fields of emplyoment for university graduates, if companies included them in their human resource planning more than before and they could perceive transparent and attainable careers. This also includes a flexible organisation of careers in public service.

The improvement of employment prospects for dual-system trained workers is an urgent requirement in view of the changes in educational choice and the current distribution of costs and revenues of education in the dual or the university system, but it is not sufficient to cover the demand for skilled-labour. Companies and institutions might also resort to alternative methods of recruiting skilled labour. As one consequence of the growing need to cut costs, there is a trend to fill jobs in the medium qualification range (formerly filled by master-craftsmen and technicians) to which skilled workers used to be promoted, with graduates from colleges for higher professional training.[18] These are trained by the education system financed with tax money while the training company bears the part of the cost of the dual system training provided by it. If this type of substitution should prove to become sustained this would result in a serious handicap for qualified skilled labour eager to make progress in their careers. And finally it might mean that German companies with international activities and such working in Germany might resort to educational concepts practiced in other countries after analysing costs and benefits.

A demand for higher qualifications may not mean that people that will not meet them directly or to the full extent can be neglected. Quite to the contrary, it remains a permanent challenge to provide them with better qualifications and reasonable opportunities to make a living. The increase in employment in the late eighties showed that particularly this group has most opportunities when the general demand for labour increases. This also means: if the production site can be saved with the help of highly qualified human capital, the integration of disadvantaged groups will become easier at wages in keeping with their productivity.

Slow learners and others that need special help must find a wider range of training measures that fit their specific abilities and possibilities. Such measures might be more

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[17] Employers are increasingly understanding it and admitting that many image problems of the dual system are "home-made". (see Top Industrial Associations: Differentiation, Permeability, Performance. Proposals by the Top Associations of Industry for the Evolution of Schools, Vocational Training and Universities, Bonn 1993).

[18] See the empirical findings of Drexel, I.: Das Ende des Facharbeiteraufstiegs? Neue mittlere Bildungs- und Karrierewege in Deutschland und Frankreich - ein Vergleich <The End of the Career of Skilled Workers? New Educational and Career Developments in Germany and France - a Comparison>, Frankfurt/New York 1993

support for the disadvantaged, assistance during training, differentiation and modular organisation of training. Reintroducing two-year training on a large scale, however, might entail the risk of selection and limited permeability, if it is not accompanied by maximum support and assistance also after the end of training. For this group as well, one must ensure advancement in keeping with its capabilities.

Universities need to reform just as much. The burning issues here are a reform of the organisation of studies to shorten the time spent at the university, to reduce the drop-out rate, to improve the quality of teaching and to make university studies generally more efficient [19] by changing internal control systems, university funding and even by making public service careers more flexible.

Universities must also do more in the way of further training – not only for their own graduates, they must adjust the subject matters covered faster to the changing demands of society and industry. Giving due consideration to employment should, however, not mean that courses of study are fractionated more and more only to meet an alleged (mostly very short-term) demand. The central basis for occupational competence is still a thorough knowledge of the technical aspects and methods of the field. In addition the course content must reflect the growing, new demands of communication-related, responsible, networked and innovative activities and the increasing importance of international interdependence.

By itself the urgently needed structural reforms of the university system will not suffice, though. In addition, their chronic lack of funds must be overcome and the number of places increased as envisaged by the Wissenschaftsrat. Even if universities only focused on economic demand and very optimistic assumptions were made regarding the reduction of the drop-out rate and the duration of studies, 1.2 m places would be required (compared to the 0.9 m currently existing places) as a minimum to meet the requirements of the society.[20] [21] The expansion of colleges for higher professional training is of special importance here. One must see, though, that these colleges might lose their special employment advantage – practically oriented, shorter courses – if they attempt to adapt their qualifications to the theoretical scientific training provided by the universities.

Finally the reform of the internal control systems of the universities is long overdue, because these are currently almost devoid of incentives. The salary system for university teachers does not sufficiently consider the actual achievements in teaching and research.

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[19] See detailed explanations in: Commission of the Federation and the Länder for educational planning and promotion of research. "White Paper with Key Issues" for the working group of the Federation and the Länder to prepare the planned national educational summit, Bonn 1993 (photocopied)

[20] As the concept of education is comprehensive, a more comprehensive social demand had to be considered as well, even though it is not necessarily focussing on economic demand.

[21] When converting the average increase of total demand for university graduates (replacement and additional demand) based on Tessaring's projections (1991, op.cit) and Weisshuhn/Wahse (1993, op. cit) by 3.0 to 3.16 m for the period 1991-2010 into numbers of graduates and students per year. This is based on optimistic assumptions for the reduction of length of studies and drop-out rates. If the duration of studies extends or drop-out rates increase, the resulting number of graudates and students will be correspondingly higher.

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To involve universities more in the selection of students, as has been demanded, can only make sense when funding (and a corresponding scholarship system) is changed at the same time. The universities must have an incentive to opt for either "more successful students studying for shorter periods" or "less funding".

Conclusion: One should not focus on specific fields, but must have a perspective including the entire educational system and its interrelationships illustrated by the labour market. For educational policy the issue is not to decide either for university studies or for apprenticeship: what is called for is to make the dual system more attractive and to improve conditions for university studies. The different appeals that practical training on the one hand and university training on the other hand have will not change as long as it is more probable to find good employment with career prospects with a higher degree and as long as higher qualifications are more and more necessary to realise such advantages – although they tend to be always less sufficient in view of a growing number of equaly qualified people .

However, it is totally inadmissible under our political system to control access to training due to economic demand. Therefore it is most important to change the "signals" given by the employment system and their effect on orientation in training and occupation.

Age in years	WITHOUT TRAINING		APPRENTICESHIP/ FULL-TIME VOCATIONAL SCHOOL		FACHSCHULE <spec. techn. colleges>		FACHHOCHSCHULE <higher prof. training college>		UNIVERSITY		TOTAL	
	No. of people	Human capital	No. of people	Human capital	No. of people	Human capital	No. of people	Human capital	No. of people	Human capital	No. of people	Human capital
	(1,000)	(DM million)	(1,000)	(DM million)	(1,000)	(DM million)	(1,000)	(DM million)	(1,000)	(DM million)	(1,000)	(DM million)
Labour Force												
15–24	823.0	121,971	2683.9	1,012,603	86.9	24,443	28.0	3,441	17.5	3,968	3639.3	1,166,426
25–34	1115.5	95,353	4440.2	1,018,791	545.2	100,122	360.0	46,418	586.3	156,173	7047.2	1,416,857
35–44	1089.7	51,750	3384.7	551,056	593.8	79,629	305.1	28,441	694.9	173,985	6068.2	884,861
45–54	1593.3	51,231	3662.5	411,031	618.5	60,827	255.2	19,076	474.5	64,072	6604.0	606,237
55 +	903.7	18,978	1370.6	100,191	297.9	20,746	94.6	5,240	218.6	21,201	2885.4	166,358
Total	5525.2	339,283	15541.9	3,093,672	2142.3	285,767	1042.9	102,616	1991.8	419,398	26244.1	4,240,738
Unemployed Persons												
15–24	170.6	25,281	143.1	53,971	7.7	2,164	1.7	210	1.3	290	324.3	81,915
25–34	196.2	16,772	245.8	56,390	22.1	4,055	17.1	2,208	47.4	12,627	528.6	92,052
35–44	144.6	6,868	143.9	23,434	11.3	1,521	9.3	863	27.1	6,785	336.2	39,470
45–54	202.2	6,502	154.5	17,344	8.2	804	4.8	355	9.9	1,335	379.6	26,340
55 +	173.7	3,647	124.1	9,071	5.2	360	4.2	230	4.8	470	311.9	13,778 0
Total	887.3	59,069	811.4	160,210	54.5	8,905	37.0	3,866	90.5	21,506	1880.6	253,556
Unemployment Rate (UER) or Utilization Rate (UR) of Human Capital, in % 2)												
	UER	UR	UER	UR	UER	UR	UER	UR	UER	UR	UER	UR
Total	13.8	85.2	5.0	95.1	2.5	97.0	3.4	96.4	4.3	95.1	6.7	94.4

1) Estimates based on expenditure for education during the period the respective age group was in education/training (standard educational biography); excluding apprentices; without double qualifications; excluding lost income; excluding expenditure paid privately or by the Bundesanstalt für Arbeit for further training other than trade and technical schools
2) UER: Percentage of unemployed of total labour force (therefore not comparable to fig. 2 or table 3); UE: 100 (human capital of unemployed as percentage of human capital of labour force), same level of training, both excluding apprentices

Sources: Bundesanstalt für Arbeit; Federal Ministry for Education and Science; Federal Statistics Office and (for participants in and expenditure for training prior to 1960): Köhler 1978; Albert/Oehler 1969, education expenditure prior 1960 partially estimates

Standard educational biographies
without training: 9 years primary school/Hauptschule <secondary modern>; 3 years part-time vocational school; on average 0.5 years vocational preparation for graduates after 1975
Apprenticeship: 9 years primary school/Hauptschule ; 3 years part-time vocational school; 3 years in plant apprenticeship
Full-time vocational school: 9 years primary school/Hauptschule ; 2 years full-time vocational school/vocational preparation
Specialized technical college: 9 years primary school/Hauptschule; 3 years part-time vocational school ; 3 years in plant apprenticeship; 2 years full-time specialized training college
Fachhochschule <higher professional training college>: 4 years primary school; 6 years Realschule; 2 years full-time Fachoberschule <senior technical college>; 3 (for graduates until 1979) or 4 years (for graduates after 1980) Fachhochschule
University: 4 years primary school; 9 years Gymnasium; 4 (for graduates until 1969) or 5 (for graduates 1970–1979) or 6 (for graduates after 1980) years university

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Appendix 2

Table 2: The Structure of the Qualification of Labour 1957 – 1991 (in %)

Level of qualification	1957 MC	1961 Census	1970 Census	1976 MC	1982 MC	1987 MC	1991 MC
without completed training	41,9	91,1	84,1	34,9	28,6	22,9	19,9
on-the-job training	32,1						
semi-skilled				51,3	55,3	58,4	59,2
apprenticeship training							
Full-time vocational school	13,0	6,0	10,5				
Specialized technical college				6,5	7,0	7,8	8,6
Higher professional training college	0,8		1,5	2,2	2,8	3,8	4,0
University	2,7	2,9	3,8	5,1	6,3	7,1	8,3
no answer, others	9,5	-	0,1	-	-	-	-
Total (in thousands)	100,0 21503	100,0 26527	100,0 26610	100,0 224705	100,0 25372	100,0 25391	100,0 28374

Notes: MC = Micro census

1957: Labour force; excluding the Saar and Berlin; excluding family workers; including "in training"; qualification = "training for the exercised occupation"
1961/1970: Labour force; including apprentices
1976–1991: Labour force, excluding apprentices (1991 preliminary estimate)

Sources: own calculations based on the MC or census of the Federal Statistics Office

Table 3: Qualification-related Unemployment Rates According to Sex (%) [a]

Qualification	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
West Germany [b]																			
Men																			
without training	7.0	5.5	5.9	5.9	5.0	6.3	10.3	14.5	16.8	17.3	18.0	17.6	18.7	18.2	16.1	14.8	14.5	16.2	20.6
Appr.ship/full-t. voc.sch.	2.9	2.5	2.2	2.0	1.6	1.8	2.9	5.1	5.9	6.1	5.9	5.3	5.4	5.4	4.8	4.4	4.1	4.6	6.3
Spec. techn. college	1.7	1.9	1.5	1.0	0.8	0.8	1.1	1.8	2.2	1.9	1.6	1.5	1.7	1.8	1.6	1.5	1.3	1.5	2.2
Higher prof. train. coll.	3.0	3.1	2.7	1.9	1.6	1.5	2.1	3.3	3.9	3.6	3.3	2.7	2.8	3.1	2.8	2.5	2.3	2.6	3.6
University	1.5	2.0	2.1	1.7	1.7	1.9	2.5	3.3	4.0	4.3	4.2	3.9	4.2	4.4	4.0	3.5	3.1	3.2	4.0
Total	4.0	3.3	3.1	2.9	2.3	2.7	4.4	6.9	8.0	8.1	8.0	7.3	7.6	7.4	6.5	5.8	5.5	6.1	8.1
Women																			
without training	7.9	7.4	7.8	7.8	7.0	7.6	10.5	12.9	15.3	15.4	16.5	17.0	17.7	17.6	16.1	14.4	12.8	14.0	16.8
Appr.ship/full-t. voc.sch.	3.8	4.5	4.5	4.2	3.6	3.7	5.0	6.6	7.7	7.8	7.9	7.4	7.3	7.2	6.5	5.7	4.7	5.0	6.3
Spec. techn. college	4.2	6.3	7.1	7.5	5.6	4.9	7.3	11.1	12.0	11.8	11.0	10.4	10.2	10.1	9.0	7.5	6.1	5.8	6.9
Higher prof. train. coll.	4.8	5.4	5.1	4.0	4.2	4.5	6.2	8.7	9.3	9.3	9.4	8.8	8.3	8.4	7.7	6.6	5.5	5.3	6.2
University	1.2	1.7	2.1	2.1	2.3	2.7	3.9	5.0	6.4	7.3	7.6	7.5	8.1	8.5	7.3	6.4	5.3	5.2	5.9
Total	5.6	5.7	5.9	5.7	5.0	5.2	7.2	9.1	10.6	10.6	10.9	10.6	10.6	10.4	9.3	8.2	7.0	7.4	9.0
Men and women																			
without training	7.4	6.4	6.8	6.9	6.0	7.0	10.4	13.7	16.0	16.4	17.2	17.3	18.2	17.9	16.1	14.6	13.6	15.1	18.6
Appr.ship/full-t. voc.sch.	3.2	3.1	3.0	2.7	2.3	2.4	3.7	5.6	6.6	6.7	6.7	6.1	6.2	6.1	5.5	4.9	4.4	4.8	6.3
Spec. techn. college	2.1	2.7	2.5	2.3	1.8	1.8	2.5	3.7	4.2	4.0	3.6	3.4	3.6	3.7	3.3	2.9	2.5	2.6	3.4
Higher prof. train. coll.	3.2	3.4	3.1	2.3	2.1	2.0	2.9	4.4	5.0	4.8	4.5	4.0	4.0	4.2	3.9	3.4	3.0	3.2	4.2
University	1.4	1.9	2.1	1.9	1.9	2.2	3.0	3.9	4.9	5.3	5.4	5.2	5.6	5.9	5.2	4.5	3.9	3.9	4.7
Total	4.6	4.2	4.2	3.9	3.3	3.6	5.5	7.7	9.0	9.1	9.1	8.7	8.8	8.6	7.7	6.8	6.1	6.6	8.5
East Germany [c]																			
Men																			
without training d)																16.2	19.4	27.4	.
Skilled worker																4.7	7.4	8.5	.
Spec. techn. college e)																5.7	9.7	7.1	.
Inst. of higher educ. f)																3.7	7.4	7.4	.
Total																5.9	8.7	9.3	.
Women																			
without training d)																15.1	40.2	48.4	.
Skilled worker																9.5	21.5	28.7	.
Spec. techn. college e)																5.4	10.0	8.0	.
Inst. of higher educ. f)																2.2	5.1	8.5	.
Total																8.4	18.3	22.8	.
Men and women																			
without training d)																15.6	31.1	39.7	.
Skilled worker																6.9	13.7	17.4	.
Spec. techn. col. e)																5.5	9.9	7.6	.
Inst. of higher educ. f)																3.1	6.4	7.8	.
Total																7.1	13.3	15.8	.

a) unemployed as % of labour force (excluding apprentices and soldiers) with the same qualifications
b) always end of September, calculated on the basis of the Bundesanstalt für Arbeit's special investigations about the unemployed: 1990-1993 some estimates (basis: micro censuses, development of the labour force according to the estimates of the Expert's Council 1993)
c) always in November; basis: Labour Market Monitor
d) including partially skilled workers
e) including 'Meister' and 'Techniker' <foremen and technicians>
f) excluding higher professional training colleges
Source: own calculations based on: micro censuses, unemployment statistics of the Bundesanstalt für Arbeit, Labour Market Monitor, Expert's Committee 1993

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